CLAIMS

1. A fuel cell assembly comprising:

a fluid flow field plate having a plurality of channels formed in the surface thereof and extending across the surface of the plate in a predetermined pattern;

a distribution foil having a plurality of channels formed in a surface thereof and extending from a first edge of the distribution foil to a second edge of the distribution foil, the channels terminating at the second edge at positions substantially coincident with respective ones of the field plate channels; and

a cover foil extending over the distribution foil to enclose the distribution foil channels and thereby form conduits for water between the two foils.

2. The fuel cell assembly of claim 1 in which the distribution foil includes:

a first series of channels extending to the first edge of the foil;

an array of channels, in communication with the first series of channels, forming a pressure distribution gallery; and

a second series of channels, in communication with the array of channels, extending to the second edge of the foil.

3. The fuel cell assembly of claim 1 or claim 2 in which the distribution foil channels terminate at the second edge of the foil at a plurality of convergence structures adapted to focus water flow into a respective channel in the fluid flow field plate.

4. The fuel cell assembly of claim 3 in which each convergence structure comprises a recess in the second edge of the distribution foil.

5. The fuel cell assembly of claim 4 in which the recess comprises an arcuate cut out in the second edge of the distribution foil.

6. The fuel cell assembly of claim 1 or claim 2 in which the distribution foil channels terminate at the first edge of the foil at at least one supply manifold aperture in the fluid flow field plate.

7. The fuel cell assembly of claim 1 in which the distribution foil is formed from stainless steel.

8. The fuel cell assembly of claim 1 or claim 7 in which the distribution foil channels are chemically etched.

9. A fuel cell assembly comprising:

a fluid flow field plate having a plurality of channels formed in the surface thereof and extending across the surface of the plate in a predetermined pattern;

a distribution foil having a plurality of channels formed in a surface thereof, the channels each extending from first positions proximal to or at a first edge of the distribution foil to second positions proximal to or at a second edge of the distribution foil, the channels terminating at the second positions substantially coincident with respective ones of the underlying plate channels; and

a cover foil co-extensive with a substantial part of the distribution foil to enclose the distribution foil channels over at least part of their length between the first and second positions and thereby form conduits for water between the two foils.

10. The fuel cell assembly of claim 9 in which the distribution foil includes:

a first series of channels extending to the first positions proximal to or at the first edge of the distribution foil;

an array of channels, in communication with the first series of channels, forming a pressure distribution gallery; and

a second series of channels, in communication with the array of channels, extending to the second positions proximal to or at the second edge of the distribution foil.

11. The fuel cell assembly of claim 9 or claim 10 in which the distribution foil channels terminate at the second positions at a plurality of convergence structures adapted to focus water flow into a respective channel in the fluid flow field plate.

12. The fuel cell assembly of claim 1 or claim 2 in which the distribution foil channels terminate at the first positions at at least one supply manifold aperture in the fluid flow field plate.

13. The fuel cell assembly of any preceding claim further including a series of fluid flow field plates, acting as cathodes and/or anodes, formed in a stack with a respective membrane-electrode assembly adjacent thereto.

14. The fuel cell assembly of claim 13 in which each cathode fluid flow field plate has a respective one of said distribution foils and said cover foils interposed between the plate and the adjacent membrane-electrode assembly.

15. A fuel cell assembly comprising:

a fluid flow field plate having a plurality of channels formed in the surface thereof and extending across the surface of the field plate in a predetermined pattern;

an adjacent membrane-electrode assembly (MEA) in contact with the fluid flow field plate over an active area of the MEA;

a distribution membrane interposed between the fluid flow field plate and the MEA, the membrane having a plurality of water conduits extending therethrough between first positions proximal to or at a first edge of the membrane to second positions proximal to or at a second edge of the membrane, the conduits terminating at the second positions substantially coincident with respective ones of the plate channels.

16. The fuel cell assembly of claim 15 in which the membrane comprises a gasket of the fuel cell assembly.

17. The fuel cell assembly of claim 16 in which the conduits are formed as channels in a surface of the gasket adjacent to the fluid flow field plate.

18. The fuel cell assembly of claim 15 in which the distribution membrane is formed as a multilayer structure.

19. A fuel cell assembly substantially as described herein with reference to the accompanying drawings.